

GenEpi-BioTrain Newsletter #6

Genomic Epidemiology and Public Health Bioinformatics Training in the EU/EEA, the Western Balkans, and Türkiye

GenEpi-BioTrain Month 1-18 (of 48)

- ✓ 83 face-to-face course days
 - 185 trainees
 - Nearly all EU/EEA countries represented
- ✓ 7 one-day virtual trainings:
 - Ca. 2,000 registrations
 - EU/EEA and other countries

In this quarterly edition of the GenEpi-BioTrain newsletter, we are excited to present the outcome of the most recent training initiatives and provide an overview of the upcoming activities.

We are currently conducting training activities in Pathogen Wave 2 (Antimicrobial Resistance, AMR), Pathogen Wave 3 (Food and Waterborne Diseases, FWD) and Pathogen Wave 4 (Vaccine-Preventable Infections, VPI).

A call for nominations for Pathogen Wave 5 (Tuberculosis, TB) and Pathogen Wave 6 (AMR) will be launched in Q4 2024.

Our unwavering commitment is to provide an exceptional learning experience for all nominated candidates within public health institutions.

Stay informed and engaged with GenEpi-BioTrain!

1-week exchange visits for bioinformaticians

Two one-week exchange visits took place at Statens Serum Institut (SSI) in Denmark in Q1 and Q2 2024.

The first visit was part of the activities for **Block 1/Pathogen Wave 2 (AMR)** trainees and was held from 18th to 22nd March 2024.

The second visit was part of the activities for **Block 1/Pathogen Wave 3 (FWD)** trainees and was held from 15th to 19th April 2024.

Each visit was attended by five trainees from different EU/EEA countries.

The visits were tailored to meet individual trainees' learning goals, which were discussed among trainees, trainers and ECDC ahead of the visits.

The exchange visits revolved around three key themes, which were tackled at different proficiency levels depending on the expertise of each trainee:

1. **Command-line skills and workflow management:** The course bolstered the command-line expertise of trainees and deepened their understanding of workflow management systems, particularly relevant for establishing robust sequencing pipelines.
2. **Phylogenetic Analysis and Visualization:** Trainees harnessed tools to create and visualize phylogenetic trees, enabling them to identify clusters and suspected outbreaks.
3. **Genomic surveillance:** Trainees immersed themselves in studying the pathogens in focus in the respective pathogen waves, acquired proficiency in utilizing tools to detect AMR and discussed the role of plasmids in outbreak detection and phylogenetic analysis.

These exchange visits also facilitated networking among participants and trainers from SSI, fostering valuable connections for future collaboration.

It is expected that trainees will disseminate the knowledge gained during the exchange visits with colleagues in their respective countries.

3-day workshop on Phylogeny



**GenEpi-BioTrain - Topical training:
Phylogeny for food- and waterborne
diseases**

A three-day workshop was conducted as part of **Block 3/Pathogen Wave 3 (FWD)** activities at the Institut Pasteur (IP) in France from 22nd to 24th April 2024.

The workshop aimed to explore evolutionary relationships between organisms based on their genomes.

Participants gained insights into the rationale behind phylogenetic analysis and acquired practical skills to perform, analyze, and interpret phylogenetic trees.

The workshop was focused on the following themes:

- 1) Finding the best evolutionary model for maximum likelihood analysis.
- 2) Inferring the phylogenetic tree results.
- 3) Assessing the clock signal in phylogenetic data and time scaling a phylogenetic tree.
- 4) Displaying, manipulating, and interpreting phylogenetic trees.

At the end of the course, trainees learned how to apply phylogenetic tools and methods for real-time surveillance of FWD pathogens (*Listeria monocytogenes*, *Salmonella enterica*, *Escherichia coli*, and *Shigella* species) and to convey the results to the microbiologists and epidemiologists for surveillance and outbreak investigations.

Detailed information about this workshop can be found on EVA: [Course: GenEpi-BioTrain - Topical training: Phylogeny for food- and waterborne diseases \(europa.eu\)](https://europa.eu/courses/genepi-biotrain-topical-training-phylogeny-for-food-and-waterborne-diseases).

3-day workshop on SQL databases



GenEpi-BioTrain - Topical training: SQL for beginners 2024

A 3-day workshop was held at the Staten Serum Institut (SSI) in Denmark as part of **Block 1/Pathogen Wave 3 (FWD) and 4 (VPI)** activities from 14th to 16th May 2024.

This course was intended for beginners in bioinformatics without prior knowledge of Structured Query Language (SQL).

The course introduced SQL, its functionality, and its uses in public health surveillance.

This was the second edition of this workshop, which incorporated valuable feedback from participants of the first edition to enhance the learning outcomes.

The workshop centered around the following key themes:

1. **Data Manipulation:** Participants learned effective techniques for manipulating extensive data, including creating, joining, and altering tables.
2. **Advanced SQL Skills:** The workshop provided practical guidance on efficient searching within SQL databases and applying functions to perform complex tasks.
3. **Automated Processes:** Trainees also acquired the skills necessary to create procedures for automating SQL processes.

By the conclusion of the course, participants gained comprehensive knowledge about the utility of SQL databases and how to effectively manage data.

Detailed information about this workshop can be found on ECDC Virtual Academy (EVA): [Course: GenEpi-BioTrain - Topical training: SQL for beginners 2024 \(europa.eu\)](https://europa.eu/course/genepi-biotrain-topical-training-sql-for-beginners-2024).

2-week Interdisciplinary workshop



GenEpi-BioTrain - Interdisciplinary training in genomic epidemiology and public health bioinformatics on food- and waterborne diseases

A 2-week Interdisciplinary workshop on genomic epidemiology and public health bioinformatics was held at IP for **Block 2/Pathogen Wave 3 (FWD)** trainees from 27th May to 7th June 2024.

The curriculum delved into surveillance and outbreak investigation techniques focusing on *L. monocytogenes*, *S. enterica*, and *E. coli*, with additional considerations related to *Klebsiella pneumoniae* and *Campylobacter jejuni*.

This workshop brought together thirty participants from ten EU/EEA countries, representing collaborative country teams of epidemiologists, microbiologists and bioinformaticians to explore how interdisciplinary interpretation of integrated results can enhance efforts to effectively prevent and control the spread of infectious diseases.

The workshop focused on several key themes:

1. **Enhanced Understanding of Genomic Epidemiology and Bioinformatics:** Participants developed a deeper grasp of genomic epidemiology and bioinformatics, equipping them with essential knowledge for analyzing genetic data in public health contexts.
2. **Proficiency in Open-Source Tools:** Trainees honed their skills in utilizing open-source tools for integrated analysis and visualization of genomic and epidemiological data. This practical training aimed to empower them with the necessary tools to address real-world challenges.
3. **Promoting Collaboration:** The workshop fostered collaboration among epidemiologists, microbiologists, and bioinformaticians within public health institutions. By enhancing teamwork and effectiveness, this collaborative approach contributes to more robust surveillance and response strategies.

Feedback from trainees indicated that the workshop significantly improved their competencies, enabling them to effectively handle actual public health genomic surveillance of FWD.

For detailed information about this workshop, please refer to EVA: [Course: GenEpi-BioTrain - Interdisciplinary training in genomic epidemiology and public health bioinformatics on food- and waterborne diseases \(europa.eu\)](#).

Upcoming activities

Future activities are presented in chronological order.

IP will organize a **Virtual Training** titled “**Waterborne disease (Leptospirosis) and Water Surveillance**”. The training will take place on **22nd & 24th July 2024**. Over 150 participants have already registered for the course on the EVA platform and registration is still open.

The primary focus of this training is to introduce participants to both theoretical and practical aspects of waterborne disease surveillance, using Leptospirosis as a specific example. For detailed information about this workshop and for **registration**, please visit the EVA platform.

[Course: GenEpi-BioTrain - Virtual training 8 - Waterborne disease and Water Surveillance \(europa.eu\)](#).

SSI will organize a **Virtual Training** titled “**Unix for beginners & Introduction to the Conda ecosystem**”. The training will take place on **20th, 21st, and 22nd August 2024**.

The webinar aims at providing a general introduction to working in Unix (i.e. use the command-line) as well as creating Conda environments for running simple bioinformatics tasks. In preparation of this webinars, trainees will receive detailed instructions to prepare themselves to work in a Unix ecosystem. A dedicated course space with all details will be open on EVA at the beginning of August 2024.

A **two-week exchange visit for bioinformaticians** will be conducted at SSI from 26th August to 6th September 2024 for five trainees belonging to pathogen wave two i.e., AMR. The program centers around analyses of trainees’ own data and is customized to meet individual trainees’ needs and align with GenEpi-BioTrain goals.

Additional training activities are planned for Q4 2024 and will be communicated in the next newsletter.